

May 9, 2003

Reply to Office Action of December 9, 2002

REMARKS

The Amendments

Claims 1, 2, 17 and 18 are amended to address the claim objections and rejections under 35 U.S.C. § 112.

The amendments do not narrow the scope of the claims and/or were not made for reasons related to patentability. The amendments should not be interpreted as an acquiescence to any objection or rejection made in this application.

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

The Restriction Requirement

The restriction, by original presentation, of claims 9, 10, 15 and 16, from claims 1-3, 6-8, 11-14 and 17-18 is respectfully traversed. The resulting rare earth magnets (or combinations containing them) recited in the restricted claims are characterized by their method of preparation. Thus, these claims are dependent claims on the examined claims. It is believed that the search of the method would substantially encompass the search for the restricted subject matter and that allowability of the examined method claims would dictate allowability of products prepared by such method. Thus, no serious burden of additional

May 9, 2003

Reply to Office Action of December 9, 2002

search or examination is seen. In the absence of such a serious burden restriction is not proper. See M.P.E.P. § 803. Thus, the requirement should be withdrawn.

Should the restriction still be maintained, it is requested that the restricted claims be rejoined into the application upon a finding of allowability of the elected invention.

The Claim Objections

The objection to claims 17 and 18 is believed to be removed by the above amendments.

The Rejection Under 35 U.S.C. § 112, First Paragraph

The rejection of claims 17 and 18 under 35 U.S.C. § 112, first paragraph, is believed to be overcome by the above amendments.

The Rejection Under 35 U.S.C. § 112, Second Paragraph

The rejection of claims 1 and 2 under 35 U.S.C. § 112, second paragraph, is believed to be overcome by the above amendments.

The Rejections Under 35 U.S.C. § 103

The rejections of claims 1, 3, 7, 11, 13 and 17 over Imaizumi (U.S. Patent No. 4,902,357) in view of Ohashi (U.S. Patent No. 4,992,234) and over Takebuchi (U.S. Patent No. 5,595,608) in view of Imaizumi – and apparently also Ohashi, though not in the statement of rejection – under 35 U.S.C. § 103 are respectfully traversed.

The Imaizumi and Takebuchi references were discussed in the Reply filed October 7, 2002, and that discussion is incorporated herein by reference. Although, the following comments on these references are provided for emphasis.

As previously established, Imaizumi fails to disclose a process wherein the permanent magnet alloy is crushed in an "oxygen-free atmosphere of argon, nitrogen or vacuum" or that the product obtained after crushing, compacting, sintering would have a low oxygen concentration of "up to 8.0% by weight." Compare applicants' claims 1 and 2. Imaizumi also fails to recognize the distinction between an oxygen and nitrogen atmosphere in the final heat treating step. Although it generally includes the possibility of a solely nitrogen atmosphere in this step, it recognizes no advantage of nitrogen over oxygen and, in fact, shows a preference to an oxygen-containing atmosphere. All of Imaizumi's examples utilize an oxygen or partial oxygen atmosphere. Takebuchi fails to disclose any manner of heat treating agent step which takes place after the cutting and/or polishing of the magnet to give a sintered magnet with a finished surface. Thus, even if assumed for argument that Takebuchi meets the mother alloy and auxiliary alloy recitations of the claims, it fails to teach or suggest the method of claim 2 when viewed in combination with Imaizumi. Neither reference teaches or suggests heat treating the sintered magnet with a finished surface in an argon, nitrogen or low-pressure vacuum atmosphere having an oxygen partial pressure of 10^{-6} to 10^0 torr for 10 minutes to 10 hours at a temperature of 200 to 1,100°C, after cutting and/or polishing the sintered magnet to give a sintered magnet with a finished surface.

As indicated in the Office Action, Ohashi discloses that pulverization of an alloy ingot for R-Fe-B alloy magnets was known to be conducted in a non-oxidizing atmosphere. However, Ohashi fails to make up for the deficiencies of Imaizumi and Takebuchi noted above, i.e., Ohashi also fails to disclose or suggest a step of heat treating the sintered magnet

with a finished surface in an argon, nitrogen or low-pressure vacuum atmosphere having an oxygen partial pressure of 10^{-6} to 10^0 torr for 10 minutes to 10 hours at a temperature of 200 to 1,100°C, after cutting and/or polishing the sintered magnet to give a sintered magnet with a finished surface. Ohashi teaches nothing about cutting and/or polishing the sintered magnet and thus teaches nothing about steps performed after such cutting and/or polishing.

Accordingly, viewing the teachings of all the references as a whole, there is no suggestion therefrom of a method involving the steps of:

“cutting and/or polishing the sintered magnet to give a sintered magnet with a finished surface, and

heat treating the sintered magnet with a finished surface in an argon, nitrogen or low-pressure vacuum atmosphere having an oxygen partial pressure of 10^{-6} to 10^0 torr for 10 minutes to 10 hours at a temperature of 200 to 1,100°C”

as recited in instant claims 1 and 2. In the absence of any such suggestion, the references fail to support a prima facie case of obviousness. The rejection under 35 U.S.C. § 103 should be withdrawn at least for this reason.

The unexpected advantages of applicants' method further proves the nonobviousness of the invention. Applicants have discovered that the exclusion of oxygen as recited in the claims leads to advantageous magnets which, particularly, exhibit excellent corrosion resistance in the presence of lubricating oils – such as encountered when the magnets are used in motor applications. See, e.g., page 2, line 34, to page 3, line 8, of the instant specification. One embodiment of this advantage of applicants' invention is demonstrated in Example 1 and Comparative Examples 1 and 2 at pages 8-11 and Figures 1-2 of the disclosure. Example 1 and Comparative Examples 1 and 2 are conducted in a side-by-side

May 9, 2003

Reply to Office Action of December 9, 2002

manner except for the final heat treatment step after cutting and polishing a finished magnet from the sintered product. In Example 1, a heat treating in an argon atmosphere with low oxygen atmosphere after cutting and polishing of a magnet plate is conducted in accordance with the invention; see page 9, lines 8-17. Comparative Example 1 was conducted in the same manner except the heat treating after cutting the finished magnet was omitted and Comparative Example 2 was conducted in the same manner except the heat treating after cutting the finished magnet was conducted in an air atmosphere. The results show advantageous magnetic properties for the magnet of Example 1 and (see Table 1) enhanced corrosion resistance over those of Comparative Examples 1 and 2, particularly in the presence of an ether oil lubricant, i.e., 1.2% corrosion in the inventive magnet compared to 31.9% and 8.9% corrosion, respectively, in the Comparative Example 1 and 2 magnets.

Contrary to recognizing the need to exclude oxygen in the manner of applicants' invention, Imaizumi appears to indicate that oxygen to some extent is desirable for their purposes. Thus, Imaizumi notes approvingly the formation of a rust layer on its magnets' surface and the content of oxygen at the surface of its magnets in Example 6 and Figure 2. Thus, it is urged that Imaizumi, contrary to suggesting applicants' invention or the advantages thereof, would direct one of ordinary skill in the art away from modifying their process to arrive at applicants' invention or recognize the advantages thereof. Takebuchi and Ohashi do not even disclose a final heat treating step and, thus, teach nothing regarding oxygen exclusion in such step. Accordingly, the advantage shown by applicants for the final heat treating step after cutting the finished product could not have been expected from the prior art. Such unexpected results, thus, further proves the nonobviousness of applicants' invention. The unexpected results are convincing to overcome any *prima facie* case of obviousness.

Appl. No.: 09/866,853

May 9, 2003

Reply to Office Action of December 9, 2002

For the above reasons, it is respectfully submitted that no combination of the teachings of Imaizumi, Takebuchi and/or Ohashi renders any of the instant claims obvious to one of ordinary skill in the art. Thus, the rejections under 35 U.S.C. § 103 should be withdrawn.

It is submitted that the claims are in condition for allowance. However, the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



John A. Sepp, Reg. No. 33,103
Attorney for Applicants

MILLEN, WHITE, ZELANO &
BRANIGAN, P.C.
Arlington Courthouse Plaza 1, Suite 1400
2200 Clarendon Boulevard
Arlington, Virginia 22201
Telephone: (703) 243-6333
Facsimile: (703) 243-6410

Attorney Docket No.: KOJIM-401

Date: May 9, 2003

K:\kojim\401\Reply to 12-9-02 OA.doc

RECEIVED
2003
GROUP 1700